QUANT-THEORY – MATERIALISM, PHILOSOPHY AND QUANTUM SCIENCE

GenericScience / 2024-03-07 / Axiom, cosmos, materialism, photon, qaunt, quantum, Qubits / Von Achim Szepanski

Exzerpt from the forthcoming book: “Quant-Theory – Materialism, Philosophy and Quantum Science”

There is nothing artificial or fashionable about the introduction of quantum physics into quantum theory; rather, it is the interpretation of the aspect of a non-mathematical physics that is capable of revitalizing both philosophy and science as quantum theory. For Laruelle, what is at stake here is not a philosophical reading of physics or even a quantum metaontology, but a quantum-oriented philosophy, simply written out as “Planck” instead of “Newton”. Quantum physics enables, as Laruelle and Görnitz claim in unison, the most fundamental or universal quasi-ontology, while mathematics is still too abstract and biology is already too specific. For Laruelle in particular, it is a matter of creating a general theory fiction that is capable of relating the various scientific disciplines to one another, whereby philosophy is not abandoned any more than physics. For Laruelle, the aim is in particular to invent a non-standardized philosophy in order to achieve a generic extension of quantum physics, i.e. the aim is by no means a purely epistemological description. Nor is it a question of extending a method possibly described as “proto-quantical” to other areas of knowledge, but rather of creating a quantical and radically generic style that can materialize in the most diverse objects of knowledge. (Laruelle 2019) …

The quantum physicist Thomas Görnitz writes something similar with regard to the creativity of axioms: “An axiomatic structure in mathematics can serve as a model for logical thinking, from which one can then derive the valid laws by logical reasoning. This appears as a deterministic structure, as we know it from classical

physics. However, which axioms are chosen is not determined by logic, it is a creative act … The choice of new axioms is reminiscent of the structure in quantum theory, in which the spaces of possible states are multiplicatively linked with each other, so that every building block conception must fail” (Görnitz/Görnitz 2016: 692). As determinations, axioms are also the results of other operations. Mathematics, in turn, provides the possibility of finding forms for phenomena of which we do not yet know what they could physically mean. However, physics must not be understood as purely virtual when it uses imaginary numbers, for example, but must constantly test its results against the resistance of reality.

In his interpretation of quantum theory, Görnitz introduces the concept of protyposis, the essential characteristic of which is a completely abstract, meaningless quantum information that is not localized, has a cosmological dimension and must be imagined without a transmitter and receiver. From the quantum level to the cosmic level, all correlations of events can be described as information processes. For Görnitz, protyposis is the “basic substance” of reality, which can take the form of material particles, energetic quanta and meaningful information. The question is whether it is better to think of meaningless information as virtual. Entropy would then not only be decay, but also order potential information.

The qubits, the elementary entities of protyposis, can be understood as the structural quanta of the cosmos. An infinite number of qubits can be arranged in such a way that they must be interpreted as one quantum particle, as two quantum particles or as many quantum particles. With protyposis, it depends on the degree of precision required and the energy available as to whether it is better to speak of one particle or a particle with a cloud of virtual quanta. If one

then postulates that the qubits are actually infinitely many and not just a possibility, then the structures of quantum field theory are also available. For Görnitz, structures are characterized by the information that they are. They can appear actual in connection with a material or energetic carrier. If they bring about something, they acquire a meaning for this process. (Ibid.: 496)

Over decades, Görnitz has developed a cosmological theory of meaningless information, the basic units of which are qubits. A qubit is extremely non-local, whereas a particle is a model for something localized. Görnitz writes: “A bit only has the states ‘yes and no’, a qubit has an infinite number of different states. It is true that not every one of these states can be realized with the same probability, some have a high probability, others are unlikely to be obtained, but there are still an infinite number of states. If one then asks whether the state that can be represented by an arrow exists, then only two answers are possible: ‘yes, the state exists’ or ‘no, it certainly does not exist’ (ibid.: 332). Together with Zeilinger, Görnitz assumes that every quantum system consists of a combination of properties that can and cannot be known (for example, one knows the location and then has an indeterminate momentum or vice versa). Accordingly, an elementary quantum system can only carry one bit of information, even though it represents two properties. In quantum-theoretically describable processes, determinacy and indeterminacy are linked via entanglement. Determinacy at one point requires indeterminacy at another point. This opens up an informatics whose basic element is no longer the bit as an elementary distinction between two distinct values. Instead, quantum informatics has to take the elementary system of entanglement as the starting point for its computing operations. Accordingly, a quantum bit (qubit) consists of two states that can be reliably distinguished by measurement, but which can only carry one bit of classical information. The constellation of the knowable and unknowable, which is typical of

quantum theory, thus represents a holistic property of the overarching quantum system.

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